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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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ANDREW F. SAYKO JR
CLARIANT CORPORATION
70 MEISTER AVENUE
SOMERVILLE, NJ 08876

EXAMINER

ASHTON, ROSEMARY E

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 11/28/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/237,125	Applicant(s) PADMANABAN ET AL.	
	Examiner Rosemary E. Ashton	Art Unit 1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 17 August 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 4, 10, 13, 15, 20, 21, 27, 29 and 31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed. 10, 14
- 6) ☒ Claim(s) 1-3, 17-19, 22-26, 28 is/are rejected.
- 7) ☐ Claim(s) 5-12, 30 is/are objected to: 5-9, 11, 12
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Election/Restriction

1. Applicant's election with traverse of Group I in Paper No. 10 filed August 17, 2001 is acknowledged. The examiner finds applicant's arguments persuasive in part and thus combines some of the inventions. The examiner does not combine the method of making an integrated circuit with the composition because the composition may be used in other methods. Process claims directed to using the composition, including all the limitations of the allowable composition, may be rejoined as provided by In re Ochai.

Because applicant elected Group I, the composition claims, in paper no. 10, with species elected for claims 2 and 3 the examiner examines the invention of Group I below. Group I includes polymer claim 17 claiming the polymer in claim 1. Polymer claims 17-20 are examined only with respect to the elected species of claim 2 and claim 3. Claim 18 is treated as a polymer having the elected species of claim 2 and claim 19 is treated as a polymer having the elected species of claim 3.

Claims 4, 10, 13, 15, 20, 21, 27, 29, 31 are withdrawn from consideration as being drawn to a non-elected Group or a non-elected species.

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2. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-12,14(multiple dependent),16-20 (17-20 polymer claims),22-26,28 (making composition and use),30,31 are drawn to a radiation absorbing composition, classified in class 430, subclass 270.1.
 - II. Claims 13,14 (multiple dependent) are drawn to a radiation absorbing composition, classified in class 430, subclass 281.1.
 - III. Claim 15,21 drawn to a radiation absorbing composition, classified in class 430, subclass 270.1.
 - IV. Claim 27,29 drawn to a method of making an integrated circuit, classified in class 430, subclass 325.

3. The inventions are distinct, each from the other because of the following reasons:

Inventions Group I and Group IV are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the radiation sensitive composition is useful in making a static resistant reticle or a printing plate.

Inventions Group I and either Group II or Group III are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP

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§ 808.01). In the instant case the different inventions are unrelated because the radiation absorbing composition of Group I does not have an unsaturated monomer as in Group II which changes the classification to 430/281.1. The inventions of Group I and III are unrelated because the polymers are different. The polymer in Group III requires the blocked isocyanate monomer to be present in the polymer. The polymer of Group I does not have a blocked isocyanate.

Inventions Group IV and either Group II or Group III are unrelated. The method claims of Group IV do not use the compositions of either Group II or Group III.

4. Applicant's election with traverse, in Paper No. 10, of Group I defined in the prior office action is acknowledged. The traversal is on the ground(s) that there is no undue burden on the examiner to search all the compositions and methods claimed. This is not found persuasive because each composition is a separate and patentably distinct composition and the composition may be used in a different method other than the claimed method (see paragraph 3 above).

Additionally, there is undue burden on the examiner because, even with an election of species, the composition requires search of a plethora of polymers because applicant is claiming a polymer having five monomer units defined as m,n,o,p and q wherein m-q are integers including zero while at least one of m and o is greater than 0. Thus, the composition comprises homopolymers of monomers m and o as well as all combinations with either monomer m or monomer o, or both m and o, with monomers n, p and q defined as 0 or greater than 0.

The requirement is still deemed proper and is therefore made FINAL.

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Comments with respect to Examination

5. Applicant's invention is directed to an antireflective coating or radiation absorbing composition comprising polymer defined by monomers m,n,o,p and q wherein m-q are integers including zero while at least one of m and o is greater than 0. Thus, the claimed polymer must have either monomer m or monomer o. Monomer m is simply an isocyanate (me)acrylate well known in the polymer art. Monomer o is a more novel monomer of an organic chromophore (me)acrylate with the elected chromophore being a 9-anthrylmethyl group wherein the anthracene ring is bound via the 9-methyl group.

The following action is directed only to the elected species for the polymers of claim 2 and claim 3. Applicant elected the species on page 2, paragraphs 9 and 12 of Paper No. 10, filed August 17, 2001.

The following claims have not been addressed below: Claims 4,10,20 and 31 are not directed to an elected species of claim 2 or 3.

Upon completing the search of the elected species the examiner searched for an antireflective coating or radiation absorbing composition comprising a polymer of (isocyanato)ethyl methacrylate (monomer m) and acrylic acid (monomer n) wherein R2 is a COOH group and R8 is H. The polymer is defined as o,p,q are 0 and m and n are greater than 1. Art was found for this polymer and used to reject applicant's invention in the rejection below.

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Allowable Subject Matter

6. Based on the elected species the examiner indicates allowable subject matter in sections (A-E) below:

A) Claims 2 and 3 are allowable for the elected species as listed below with m-q as defined in the claims:

R2	R3	R8	D	Z	R8=H for unit q
COOCH ₃	COOD	CH ₃	anthracyl-9-methyl	O	“
COOCH ₃	COOD	H	anthracyl-9-methyl	O	“

The following is a statement of reasons for the indication of allowable subject matter: The prior art does not teach an antireflective coating or radiation absorbing composition having the polymers with elected species wherein m-q are integers including zero while at least one of m and o is greater than 0. Thus an antireflective coating or radiation absorbing composition was not found comprising homopolymers or copolymers of (isocyanato)ethyl (me)acrylate or (9-anthracenylmethoxycarbonyl)aminoethyl (me)acrylate wherein the copolymers have the elected species of monomers. For claim 3 applicant's elected species is the same as in claim 2 except monomer o has a NH group bound to D whereas in claim 2 monomer o has an O bound to D.

B) Claims 5-7,9,12 are allowable for the elected species in claims 2 and 3 because the polymers have monomer o.

Claim 8 is allowable only for R6= methyl which is the elected species.

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Claim 10 is allowable for the elected species in claims 2 and 3, wherein R8 is methyl or H, because an antireflective coating or radiation absorbing composition having a polymer of monomer m/monomer q 2-isocyanatoethyl methacrylate/maleic anhydride is not known.

Claim 11 is allowable for the elected species in claims 2 and 3, wherein R8 is methyl or H, because an antireflective coating or radiation absorbing composition having a polymer of monomer m/monomer p 2-isocyanatoethyl methacrylate/9-anthrylmethyl methacrylate is not known.

Claim 14 is allowable for the elected species of claims 2 and 3 with m-q as defined in the claims.

C) Polymers allowable for claims 17-19 for the elected species when m is greater than 0, o is 0 are 2-isocyanatoethyl methacrylate/9-anthrylmethyl methacrylate; 2-isocyanatoethyl methacrylate/maleic anhydride; 2-isocyanatoethyl methacrylate/maleic anhydride/9-anthrylmethyl methacrylate; 2-isocyanatoethyl methacrylate/maleic anhydride/9-anthrylmethyl methacrylate/methyl methacrylate; 2-isocyanatoethyl methacrylate/maleic anhydride/methyl methacrylate; 2-isocyanatoethyl methacrylate/9-anthrylmethyl methacrylate/methyl methacrylate and any of the copolymers cited above with monomer o elected for claim 2 or claim 3.

Additionally, when o is greater than 0 polymers are allowable for the elected species of claim 2 when at least one of m,n,p,q is greater than 0 and o is greater than 0. m,n,p,q can not be 0 at the same time because the homopolymer of monomer o reads on Cummings below. When o is greater than 0 polymers are allowable for the elected species of claim 3 when m,n,p,q are integers

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including 0 and o is greater than 0. Claims 17-19 read on a homopolymer of isocyanatoethyl methacrylate however this polymer is known as shown in Foss below. The reason for allowable subject matter is that the prior art does not teach polymers limited to the monomers above.

D) The method claim 25 and claim 28 are allowable for the composition having polymers with the elected species for claims 2 and 3 with m-q as defined in the claim as listed below:

R2	R3	R8	D	Z	R8=H for unit q
COOCH3	COOD	CH3	anthracyl-9-methyl	O	“
COOCH3	COOD	H	anthracyl-9-methyl	O	“

for the reasons stated in section A above.

E) The composition of claim 30 is allowable for polymers having the elected species of claims 2 and 3 only for monomer units listed in claim 30 as (1-7) because no art was found for the specific polymers.

F) The following claims have not been addressed and are considered drawn to a non-elected invention: Claims 4,10,20 and 31 are not directed to an elected species of claim 2 or 3.

Claim Objections

7. Claim 16 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Claim 16 refers to “and/or blocked derivatives thereof”. The blocked derivatives correspond to the non-elected invention of claim 15 in Group III above and broadens the invention of claim 1 rather than limiting the subject matter. Applicant is requested to cancel the subject matter from the claim.

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8. Claims 5-12,30 are objected to because of the following informalities: The claims are objected to because while they have allowable subject matter directed to the elected species they are not yet limited to the elected species. Appropriate correction is required.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 22-24,26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims are directed to a method of making the composition which comprises the step of "dissolving the polymer of claim 2 or 3 having isocyanate groups". An isocyanate group has the formula $R-N=C=O$ and only monomer m in claims 2 and 3 has an isocyanate group. Monomer m does not have to be present in the polymer of claim 2 or claim 3. What polymer is applicant trying to claim?

11. Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 16 refers to the "proportion of total molar numbers" but than refers to "% by weight". Should this be mol %?

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Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1,2,3,17-19,25,28 are rejected under 35 U.S.C. 102(b) as being anticipated by Li et al WO 9634316.

O.K.

Li teaches a radiation sensitive coating comprising a photoacid generator of diphenyliodonium hexafluorophosphate, solvent and the polymer isocyanatoethyl methacrylate/acrylic acid. The polymer meets the limitations of claims 1-3,17-19 when m and n are greater than 0 and o,p,q are 0, R2 is COOH. As shown in Examples 4-6 on page 17 and in example 17 on page 22 the polymer is mixed in a composition comprising a solvent, coated on a substrate and heated. The radiation sensitive composition is used to make a lithographic printing plate sensitive to 488 nm and 532 nm light.

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14. Claims 17,18 are rejected under 35 U.S.C. 102(b) as being anticipated by Cumming et al. U.S. patent no. 5,414,069.

In col. 10 Cumming teaches a polymer of (9-anthracenylmethoxycarbonyl)aminoethyl (me)acrylate. The polymer meets the limitations of the elected species for claims 17 and 18, using the elected species for claim 2, when m,n,p,q are 0 and o is greater than 1.

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Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over ~~Li~~^{o / c} et al in view of Nishi et al. U.S. patent no. 6,048,661.

As shown above Li teaches applicant's invention of a radiation sensitive composition comprising the polymer (isocyanato)ethyl methacrylate/acrylic acid and a photoacid generator (PAG). Li does not teach that the composition also comprises a free amine.

The addition of a basic amine to a radiation sensitive composition comprising a PAG is well known in the art. The addition of a base yields better pattern resolution.

As stated in col. 34, lines 59-63, below Nishi teaches the addition of a base additive, such as aliphatic amines to a radiation sensitive composition comprising a PAG improves pattern resolution:

This basic compound (F) used as an additive should suitably comprise a compound which can decrease the rate at which the acid produced by the acid generator diffuses through the resist film. As a result of the addition of such a basic compound, the rate of diffusion rate of the acid through the resist film is decreased to improve the resolution, so that the change in sensitivity after exposure to light can be minimized, the dependence on the substrate and the environment can be reduced, and the exposure latitude and the resulting pattern profile can be improved.

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It would have been obvious to one of ordinary skill in the art to add a free amine to the composition of Li with a reasonable expectation of obtaining a radiation sensitive composition because Nishi teaches the addition of a free amine improves pattern resolution for the composition. The motivation to combine is to provide a composition whereby the change in sensitivity after exposure to light can be minimized, the dependence on the substrate and the environment can be reduced, and the exposure latitude and the resulting pattern profile can be improved.

17. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al cited above.

Li does not teach the amount of isocyanate group monomer relative to the total monomers is 0.1 to 40 % by wt. but reports a ratio of 0.5-0.8 isocyanate to 1 acid.

However, it would have been obvious to one of ordinary skill in the art to vary the amount of reagents in the composition through routine experimentation so as to obtain a radiation sensitive composition for pattern formation because optimization of reagent concentrations is well known in the art. As stated in section 2144.05(b) of the MPEP:

"Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller , 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

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Claim Rejections - 35 USC § 102

18. Claims 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Uytterhoeven et al. U.S. patent no. 4,663,265.

In col. 9, preparation 8, Uytterhoeven teaches the polymer isocyanatoethyl methacrylate/methyl methacrylate which meets the limitations of claims 17-19 for the elected species of claims 2 and 3 when m and n are greater than 0 and o,p,q are 0.

19. Claims 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Foss et al. U.S. patent no. 5,266,651.

In col. 13, procedure B, Foss teaches the homopolymer of isocyanatoethyl methacrylate which meets the limitations of claims 17-19 for the elected species of claims 2 and 3 when m is greater than 0 and n,o,p,q are 0.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to R. Ashton whose telephone number is (703) 308-2057 or to Supervisory Examiner J. Baxter whose telephone number is (703) 308-2303. The examiner works a flexible schedule and can be reached M-F after 9:30 am.



**ROSEMARY ASHTON
PRIMARY EXAMINER**

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November 9, 2001